ES-6

Supporting Content Web Sites

Virtual Dating
http://www.sciencecourseware.org/VirtualDating/
Virtual labs that allow students to virtually "date" isotopes and carbon. Giving examples, and unknowns, can be used as an assessment tool as it provides quizzes and guides throughout the lab.

Virtual Radiometric Dating
http://www.nyu.edu/classes/gspscience/hou/html/radiodec/radiodec.html
Site offers good explanation of radiometric and isotopic dating in relation to the age of the Earth. Good definitions and graphics to supplement the core objectives.

UCMP TIME MACHINE Geologic Time Scale
http://www.ucmp.berkeley.edu/help/timeform.html
Site offers a virtual look into the past. Includes a very easy to navigate Geologic time line with interactive links that give pictures and descriptions of what the Earth looked like during specific times. Including Localities, stratigraphy, ancient life, tectonics. Comparing what the Earth looked like then verses today.

Earth Floor: Geologic Time
http://www.cotf.edu/ete/modules/msese/earthsysflr/paleozoic.html
Site offers interactive menus to guide through excellent graphics and introductory explanations including topics such as; diversity, adaptation, plate tectonics, water and rock cycles, spheres, biomes, and geologic time.

Paleomap Project
http://www.scotese.com/Default.htm
Illustrates the plate tectonic development of the ocean basins and continents, as well as the changing distribution of land and sea during the past 1100 million years.
Website is full of full-color paleogeographic maps showing the ancient mountain ranges and shorelines, active plate boundaries, and the extent of paleoclimatic belts.

The paleontology Portal
http://www.paleoportal.org
Exploring fossils, flora and fauna, time, space and careers in paleontology.
Website is easy to navigate and has further sites to explore under this topic.

Suggested Literature

Knoll, A. (2003) *Life on a Young Planet: The First Three Billion Years of Evolution on Earth*. Princeton University Press: Princeton NJ
ISBN: 0-6910-0978-3

Cracraft, J.; Bybee, R. (2005) *Evolutionary Science and Society: Educating a New Generation.* Biological Sciences Curriculum Study (BSCS): Colorado Springs, CO

ISBN: 1-9296-1423-3

Dawkins, R. (2004) *Ancestor's Tale: A Pilgrimage to the Dawn of Evolution:* Houghton Mifflin Company
Boston, MA ISBN 0618005838

White, J. (2005) Hands-On Archaeology: Real-Life Activities for Kids Prufrock Press: Austin, TX
ISBN 1593631626

Cattermole, P. (2000) *Building Planet Earth: Five Billion Years in Earth History*. Cambridge University Press: New York, NY
ISBN 0-521-58278-4

Coenraads, R. (2005) *Rocks & Fossils: A Visual Guide*. Firefly Books Inc. Toronto, Ontario, BC
ISBN 1-5540-7068-6

Murray, R. (2004) *Evidence from the Earth: Forensic Geology and Criminal Investigation*. Mountain Press Publishing Company
Missoula, MT
ISBN 0-8784-2498-9

Martill, D.; Naish, D. (2000) *Walking with Dinosaurs: The Evidence.* Dorling Kindersley, Inc. New York, NY
ISBN 0-7894-7167-1

Benton, M. (2000) *Walking with Dinosaurs: Fascinating Facts* Dorling Kindersley, Inc. New York, NY
ISBN 0-7894-7168-X

Wiggins, A.; Wynn, C. (2003) *Five Biggest Unsolved Problems in Science* .John Wiley And Sons, Inc. New York, NY ISBN 0-4712-6808-9

Suggested ETV Streamline SC or ITV Video Resources

Our Changing Earth
The Origins of Planet Earth
ETV Streamline SC
Overview of the age and creation of the Earth
1:00
ES 6.3

Our Changing Earth
Forces that Affect the Earth's Crust
ETV Streamline SC
Several segments that include weathering, erosion, deltas, glaciers, and continental drift how they affect and shape the Earth's Crust
15:00
ES 6.3

Off the Map: Colossal Fossil
Is that you, Sue? The Dinosaur Discovery of a Lifetime
ETV Streamline SC
Discovery of the world's most complete Tyrannosaurus-Rex fossil.
3:17
ES 6.3

Journal: Colossal Claw
In Search of a Lost Planet: A Paleontologist and His Crew Look For Dinosaur Fossils
ETV Streamline SC
4:59
ES 6.4

Historical Geology: A Glimpse of Earth's Past
What is the Geologic Time Scale?
ETV Streamline SC
Breaks the Geologic Time scale into 15 segments explaining various periods and eras what the Earth looked like and what happened in each time frame.
21:01
ES 6.2

Earth Science: History of the Earth
Early Life on Earth
ETV Streamline SC

Explains what the early Earth looked like and what types of organisms lived in early Earth.
4:37
ES 6.1

Earth Science: History of the Earth
Thermal Features of Earth: Boiling Mud Pots, Streaming Vents, and Gigantic Hot Springs
ETV Streamline SC
Features that can be observed today, explain how life formed millions of years ago.
4:00
ES 6.1

Math Factor: Exponential Growth and Decay
Carbon Dating
ETV Streamline SC
Overview and explanation of how carbon dating works and the applications in which it is used.
2:46
ES 6.4

Earth Science: Rocks and Minerals
The Geology of the Grand Canyon
ETV Streamline SC
Rock layers give evidence of Earth's history
4:06
ES 6.4

Earth Science: Rocks and Minerals
The Geology of the Yosemite Valley
Changes in the terrain give evidence of Earth's history
3:14
ES 6.4

Career Connections

Geologist: Professional geologists work for a wide range of government agencies, private firms, and non-profit and academic institutions. Local, state, and national governments hire geologists to help plan and evaluate excavations, construction sites, environmental remediation projects, and natural disaster preparedness, as well as to investigate natural resources. An engineering geologist (a geologist trained, experienced and certified in the field of engineering geology) is called upon to investigate geologic hazards and geologic constraints for the planning, design and construction of public and private engineering projects, forensic and post-mortem studies, environmental impact analysis. Petroleum and mining companies and large-scale land developers use geologists' and engineering geologists' skills to help them locate oil and minerals, adapt to local features such as karst

deposits or the risk of earthquakes, and comply with environmental regulations. Geologists in academia usually hold an advanced degree in a specialized area within the discipline

Paleontology: Modern paleontology sets ancient life in its contexts by studying how long-term physical changes of global geography ("paleogeography") and climate ("paleoclimate") have affected the evolution of life, how ecosystems have responded to these changes and have changed the planetary environment in turn, and how these mutual responses have affected today's patterns of biodiversity. Hence, paleontology overlaps with geology, the study of rocks and rock formations, as well as botany, biology, zoology, and ecology – fields concerned with living creatures and how they interact.

The major subdivisions of paleontology include paleozoology (animals), paleobotany (plants), and micropaleontology (microfossils). Paleozoologists may specialize in invertebrate paleontology, which deals with animals without backbones, or in vertebrate paleontology, dealing with fossils of animals with backbones, including fossil hominids (paleoanthropology). Micropaleontologists study microscopic fossils, including organic-walled microfossils whose study is called palynology.

There are many developing specialties such as paleoecology, ichnology (the study of tracks and burrows) and taphonomy (the study of what happens to organisms after they expire). Major areas of study include the correlation of rock strata with their geologic ages and the study of evolution of life forms. Paleontology utilizes the same classic binomial nomenclature scheme devised for the biology of living things by the mid 18th century Swedish biologist Carolus Linnaeus and increasingly sets these species in a genealogical framework, showing their degrees of interrelatedness using the still somewhat controversial technique of "cladistics".

The primary economic importance of paleontology lies in the use of fossils to determine the age and nature of the rocks that contain them or the layers above or below. This information is vital to the mining industries and especially the petroleum industry. Simply looking at the fossils contained in a rock remains one of the fastest and most accurate means of telling how old that rock is.

Fossils were known by primitive man and were sometimes identified correctly as the remains of ancient life forms. The organized study of paleontology dates from the late 18th century.